

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Patent No. : 6,975,850
Application No. : 09/889,682
Issue Date : December 13, 2005
Inventors : Tuija HURTTA et al.
Art Unit : 2687
Examiner : Sam Bhattacharya
Title : CHARGING EFFICIENCY

ATTN: Certificate of Correction Branch
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

May 16, 2006

REQUEST FOR EXPEDITED ISSUANCE OF CERTIFICATE OF CORRECTION

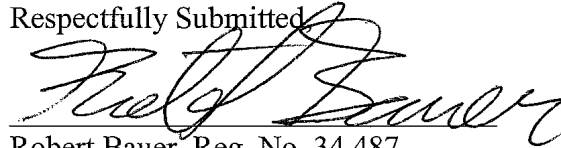
Sir:

Attached is a request (filed pursuant to 37 CFR 1.322 only) for a Certificate of Correction, the text of which is submitted on a Certificate of Correction form, PTO/SB/44 (also referred to as PTO 1050). The location of the error in the printed patent is identified on form PTO/SB/44 by claim and line number.

Also attached is evidence to show that the error is attributable solely to the Office. This supporting documentation supports the patentee's request so that the request can be processed without the patent file. Specifically, the documentation consists of copies of the Amendment filed on April 27, 2005; the Notice of Allowability dated July 15, 2005 responsive to the Amendment filed on April 27, 2005; and the issued patent. On page 2 of the Notice of Allowability, the Examiner made an Examiner's Amendment after line 11 in claim 54 of the application (renumbered as claim 26 in the patent). The Examiner's Amendment consists of an indented paragraph to be inserted. It can be seen from the attached copy of the Amendment filed on April 27, 2005 that line 11 of claim 54 ends with the words "charging apparatus". It can be seen from the attached copy of the issued patent that line 16 of claim 26 in the issued patent is equivalent to line 11 of claim 54 in the Amendment.

It is believed that no fees are due for this Request for Expedited Issuance of Certificate of Correction. However, if any fees are necessary for the expedited issuance of the Certificate of Correction, then please charge any such fees to Deposit Account No. 10-0100 (NOKIA.4001US).

Respectfully Submitted,

A handwritten signature in black ink, appearing to read "Robert Bauer", is written over a horizontal line.

Robert Bauer, Reg. No. 34,487

Lackenbach Siegel, LLP

One Chase Road

Scarsdale, NY 10583

Tel: (914) 723-4300

Fax: (914) 723-4301

Enc.: Certificate of Correction
Amendment filed April 27, 2005
Notice of Allowability dated July 15, 2005
Letters Patent 6,975,850

**UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION**Page 1 of 1

PATENT NO. : 6,975,850

APPLICATION NO.: 09/889,682

ISSUE DATE : December 13, 2005

INVENTOR(S) : Tuija HURTTA, et al.

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Claim 26, after line 16, insert the following indented paragraph:

--information transfer apparatus for transferring the charging arrangement information stored at the subscriber information store from the subscriber information store to the packet data interface apparatus;--

MAILING ADDRESS OF SENDER (Please do not use customer number below):

Robert M. Bauer Lackenbach Siegel, LLP One Chase Road Scarsdale, New York 10583 U.S.A.

This collection of information is required by 37 CFR 1.322, 1.323, and 1.324. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1.0 hour to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Attention Certificate of Corrections Branch, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.



UNITED STATES PATENT AND TRADEMARK OFFICE

JUN 18 2005

By

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
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www.uspto.gov

MDC DOCKET

NOTICE OF ALLOWANCE AND FEE(S) DUE

43829 7590 07/15/2005

ROBERT M BAUER, ESQ.
LACKENBACH SIEGEL, LLP
1 CHASE ROAD
SCARSDALE, NY 10583

EXAMINER

BHATTACHARYA, SAM

ART UNIT

PAPER NUMBER

2687

DATE MAILED: 07/15/2005

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/889,682	01/07/2002	Tuija Hurta	NOKI14-00004	7117

TITLE OF INVENTION: CHARGING EFFICIENCY

APPLN. TYPE	SMALL ENTITY	ISSUE FEE	PUBLICATION FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1400	\$0	\$1400	10/17/2005

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. **PROSECUTION ON THE MERITS IS CLOSED.** THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. **THIS STATUTORY PERIOD CANNOT BE EXTENDED.** SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE REFLECTS A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE APPLIED IN THIS APPLICATION. THE PTOL-85B (OR AN EQUIVALENT) MUST BE RETURNED WITHIN THIS PERIOD EVEN IF NO FEE IS DUE OR THE APPLICATION WILL BE REGARDED AS ABANDONED.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL should be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). Even if the fee(s) have already been paid, Part B - Fee(s) Transmittal should be completed and returned. If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: **Mail**

Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571) 273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

43829 7590 07/15/2005

ROBERT M BAUER, ESQ.
LACKENBACH SIEGEL, LLP
1 CHASE ROAD
SCARSDALE, NY 10583

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/889,682	01/07/2002	Tuija Hurta	NOKI14-00004	7117

TITLE OF INVENTION: CHARGING EFFICIENCY

APPLN. TYPE	SMALL ENTITY	ISSUE FEE	PUBLICATION FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1400	\$0	\$1400	10/17/2005

EXAMINER	ART UNIT	CLASS-SUBCLASS
BHATTACHARYA, SAM	2687	455-405000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
- ☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

- (1) the names of up to 3 registered patent attorneys or agents OR, alternatively,
- (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1	_____
2	_____
3	_____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are enclosed:

- ☐ Issue Fee
- ☐ Publication Fee (No small entity discount permitted)
- ☐ Advance Order - # of Copies _____

4b. Payment of Fee(s):

- ☐ A check in the amount of the fee(s) is enclosed.
- ☐ Payment by credit card. Form PTO-2038 is attached.
- ☐ The Director is hereby authorized by charge the required fee(s), or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)

- ☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

The Director of the USPTO is requested to apply the Issue Fee and Publication Fee (if any) or to re-apply any previously paid issue fee to the application identified above. NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____

Date _____

Typed or printed name _____

Registration No. _____

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/889,682	01/07/2002	Tuija Hurta	NOKI14-00004	7117
43829	7590	07/15/2005	EXAMINER	
ROBERT M BAUER, ESQ. LACKENBACH SIEGEL, LLP 1 CHASE ROAD SCARSDALE, NY 10583			BHATTACHARYA, SAM	
			ART UNIT	PAPER NUMBER
			2687	

DATE MAILED: 07/15/2005

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 480 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 480 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571) 272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at (703) 305-8283.

Notice of Allowability

Application No.

09/889,682

Examiner

Sam Bhattacharya

Applicant(s)

HURTTA ET AL.

Art Unit

2687

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the Amendment filed on April 27, 2005.
2. ☒ The allowed claim(s) is/are 29-55.
3. ☐ The drawings filed on _____ are accepted by the Examiner.
4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☒ All b) ☐ Some* c) ☐ None of the:
 1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 6. ☒ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☒ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date 20050705.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit
of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☒ Interview Summary (PTO-413),
Paper No./Mail Date 20050705.
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Robert Bauer on July 5, 2005.

The application has been amended as follows:

in claim 54, after line 11, the following indented paragraph is inserted: "information transfer apparatus for transferring the charging arrangement information stored at the subscriber information store from the subscriber information store to the packet data interface apparatus;"
claim 56 is canceled.

Drawings

2. New corrected drawings are required in this application because the drawings filed on 4/27/05 are informal. Applicant is advised to employ the services of a competent patent draftsperson outside the Office, as the U.S. Patent and Trademark Office no longer prepares new drawings. The corrected drawings are required in reply to the Office action to avoid abandonment of the application. The requirement for corrected drawings will not be held in abeyance.

Allowable Subject Matter

3. The following is an examiner's statement of reasons for allowance: the prior art fails to disclose a combination of steps in a method for performing charging in a telecommunications system, including generating by means of a packet data interface apparatus usage information messages indicative of the usage of the packet data communication by the first terminal, transferring the usage information messages to a charging apparatus, transferring the charging arrangement information stored at the subscriber information store from the subscriber information store to the packet data interface apparatus, and storing at the packet data interface apparatus the charging arrangement information received from the subscriber information store for the first communication terminal, wherein the step of generating usage information messages comprises generating the usage information messages dependent on the charging arrangement information for the first communication terminal, as in claim 29; the prior art likewise fails to disclose a combination of elements in a telecommunications system, including packet data interface apparatus generating usage information messages indicative of the usage of the packet data communication services by the first terminal, message transfer apparatus for transferring the usage information messages to a charging apparatus, information transfer apparatus for transferring the charging arrangement information stored at the subscriber information store from the subscriber information store to the packet data interface apparatus, wherein the packet data interface apparatus is adapted to receive and store the charging arrangement information for the first communication terminal and to generate the usage information messages dependant on the charging arrangement information for the first communication terminal, as in claim 54.

Art Unit: 2687


Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sam Bhattacharya whose telephone number is (571) 272-7917. The examiner can normally be reached on Weekdays, 9-6, with first Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lester G. Kincaid can be reached on (571) 272-7922.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

sb


7/11/06
LESTER G. KINCAID
PRIMARY EXAMINER

Interview Summary

Application No.

09/889,682

Applicant(s)

HURTTA ET AL.

Examiner

Sam Bhattacharya

Art Unit

2687

All participants (applicant, applicant's representative, PTO personnel):

(1) Sam Bhattacharya.

(3) _____.

(2) Robert Bauer.

(4) _____.

Date of Interview: 05 July 2005.

Type: a) ☒ Telephonic b) ☐ Video Conference
c) ☐ Personal [copy given to: 1) ☐ applicant 2) ☐ applicant's representative]

Exhibit shown or demonstration conducted: d) ☐ Yes e) ☐ No.

If Yes, brief description: _____.

Claim(s) discussed: 29, 54 and 56.

Identification of prior art discussed: None discussed.

Agreement with respect to the claims f) ☒ was reached. g) ☐ was not reached. h) ☐ N/A.

Substance of Interview including description of the general nature of what was agreed to if an agreement was reached, or any other comments: It was agreed that amending claim 54 to recite information transfer apparatus for transferring the charging arrangement information stored at the subscriber information store from the subscriber information store to the packet data interface apparatus and canceling claim 56 would place the application in condition for allowance.

(A fuller description, if necessary, and a copy of the amendments which the examiner agreed would render the claims allowable, if available, must be attached. Also, where no copy of the amendments that would render the claims allowable is available, a summary thereof must be attached.)

THE FORMAL WRITTEN REPLY TO THE LAST OFFICE ACTION MUST INCLUDE THE SUBSTANCE OF THE INTERVIEW. (See MPEP Section 713.04). If a reply to the last Office action has already been filed, APPLICANT IS GIVEN ONE MONTH FROM THIS INTERVIEW DATE, OR THE MAILING DATE OF THIS INTERVIEW SUMMARY FORM, WHICHEVER IS LATER, TO FILE A STATEMENT OF THE SUBSTANCE OF THE INTERVIEW. See Summary of Record of Interview requirements on reverse side or on attached sheet.

Examiner Note: You must sign this form unless it is an Attachment to a signed Office action.

Examiner's signature, if required

ATTY DOCKET NO. 6173/4001US

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**RECEIVED
CENTRAL FAX CENTER****APR 27 2005**

In re Application of : Tuija HURTTA et al.
Application No. : 09/889,682
Filing Date : January 7, 2002
Art Unit : 2687
Examiner : Sam Bhattacharya
Title : IMPROVING CHARGING EFFICIENCY

April 27, 2005

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

AMENDMENT

Sir:

Applicants gratefully acknowledge the Office Action dated January 27, 2005. It is respectfully requested that the application be amended as follows:

Amendments to the claims begin on page 2.

Remarks begin on page 8.

IN THE CLAIMS:

Please amend the claims in accordance with the following listing of claims:

29. (Currently amended) A method for performing charging in a telecommunications system, comprising:

storing at a subscriber information store subscription information including charging arrangement information indicative of the charging arrangement for a first communication terminal operating in the telecommunications system;

providing by means of packet data interface apparatus packet data communication services to the first terminal, the packet data interface apparatus being capable of interfacing between the first communication terminal and a packet-switched data link to another communications terminal;

generating by means of the packet data interface apparatus charging usage information messages indicative of the usage of the packet data communication services by the first terminal; and

transferring the charging usage information messages to a charging apparatus;

the method further including the steps of:

transferring the charging arrangement information stored at the subscriber information store from the subscriber information store to the packet data interface apparatus;

and

storing at the packet data interface apparatus the charging arrangement information received from the subscriber information store for the first communication terminal;

and

wherein the step of generating charging usage information messages comprises generating the said charging usage information messages dependent on the charging arrangement information for the first communication terminal.

30. (Currently amended) A method as claimed in claim 29, wherein:

~~the step of generating the charging messages comprises:~~

determining on the basis of the charging arrangement information for the first communication terminal stored at the packet data interface apparatus whether a communication with the first terminal is liable to charging; and
generating a charging message for the communication if the communication is liable to charging; and
a charging operation to attribute to a subscriber for the first communications terminal a charge for use of the communication services by the first terminal is performed by means of the charging apparatus.

31. (Currently Amended) A method as claimed in claim 30~~29~~, wherein the step of generating the usage information messages comprises:

it is determining on the basis of the ed that a communication is not liable for charging if charging arrangement information for the first communication terminal stored at the packet data interface apparatus whether a indicates that the communication with the first communication terminal is subjectliable to flat rate payment charging; and
generating a charging message for the communication if the communication is liable to charging.

32. (Previously presented) A method as claimed in claim 30, wherein it is determined that a communication is not liable for charging if charging arrangement information for the first communication terminal stored at the packet data interface apparatus indicates that the communication is subject to pre-payment.

33. (Previously presented) A method as claimed in claim 30, wherein it is determined that a communication is not liable for charging if charging arrangement information for the first communication terminal stored at the packet data interface apparatus indicates that the communication is free of charge.

34. (Previously presented) A method as claimed in claim 30 wherein it is determined that a communication is not liable for charging if a session itself indicates that the communication is free of charge.

35. (Currently amended) A method as claimed in claim 29 wherein the charging usage information message is indicative of the duration and/or type of the communication.

36. (Currently Amended) A method as claimed in claim 29 wherein the charging usage information message is indicative of an amount of data transferred in the communication.

37. (Currently Amended) A method as claimed in claim 29 wherein the charging usage information message is indicative of the identity of the first communication terminal.

38. (Currently Amended) A method as claimed in claim 29 wherein the charging usage information message is a CDR ticket.

39. (Previously presented) A method as claimed in claim 29 wherein the step of transferring the charging arrangement information to the packet data interface apparatus is performed during attachment of the first communication terminal to the telecommunications system.

40. (Previously presented) A method as claimed in claim 29 wherein the subscriber information store is a home location register.

41. (Previously presented) A method as claimed in claim 40 wherein the home location register stores information indicative of access point names available to the first terminal, and the method includes the step of accessing that information.

42. (Previously presented) A method as claimed in claim 29 wherein the packet data interface apparatus is capable of interfacing between a packet radio connection with the first communication terminal and a packet-switched data link to the other communications terminal.

43. (Previously presented) A method as claimed in claim 42, wherein the packet radio connection is a general packet radio service (GPRS) connection.

44. (Previously presented) A method as claimed in claim 29 wherein the packet data interface apparatus comprises a serving GPRS support node (SGSN).

45. (Previously presented) A method as claimed in claim 44, wherein the charging arrangement information for the first communication terminal is stored at the SGSN.

46. (Previously presented) A method as claimed in claim 29 wherein the packet data interface apparatus comprises a global GPRS support node (GGSN).

47. (Previously presented) A method as claimed in claim 46, wherein the charging arrangement information for the first communication terminal is stored at the GGSN.

48. (Previously presented) A method as claimed in claim 46 wherein the step of transferring the charging arrangement information to the packet data interface apparatus comprises transferring the charging arrangement information to the SGSN.

49. (Previously presented) A method as claimed in claim 48, comprising the step of transferring the charging arrangement information from the SGSN to the GGSN.

50. (Previously presented) A method as claimed in claim 49 wherein the said step of transferring the charging arrangement information from the SGSN to the GGSN is performed if it is determined that the communication is subject to hot billing.

51. (Previously presented) A method as claimed in claim 46 wherein the step of determining whether a communication with the first terminal is liable to charging is performed by means of the SGSN and the GGSN.

52. (Previously presented) A method as claimed in claim 51 wherein the said step of generation of the chargingusage information messages is performed by means of the GGSN and SGSN.

53. (Previously presented) A method as claimed in claim 29 wherein the telecommunications system is a universal mobile telecommunications system (UMTS).

54. (Currently Amended) A telecommunications system, comprising:
a subscriber information store storing subscription information including charging arrangement information indicative of the charging arrangement for a first communication terminal operating in the telecommunication system;
packet data interface apparatus for providing packet data communication services to the first terminal, the packet data interface apparatus being capable of interfacing between the first communication terminal and a packet-switched data link to another communications terminal, and generating chargingusage information messages indicative of the usage of the packet data communication services by the first terminal;
message transfer apparatus for transferring the chargingusage information messages to a charging apparatus;
and wherein the packet data interface apparatus is adapted to receive and store the charging arrangement information for the first communication terminal and to generate the said chargingusage information messages dependant on the charging arrangement information for the first communication terminal.

55. (Previously presented) A telecommunications system as claimed in claim 54, wherein charging apparatus is capable of performing a charging operation to attribute to a

subscriber for the first communications terminal a charge for use of the communication services by the first terminal.

56. (New) A packet data interface apparatus for providing packet data communication services to a first communication terminal operating in a telecommunications system, the packet data interface apparatus being capable of:

interfacing between the first communication terminal and a packet-switched data link to another communication terminal; and

generating usage information messages indicative of the usage of the packet data communication services by the first terminal;

the packet data interface being adapted to:

receive and store charging information indicative of the charging arrangement for the first communication terminal; and

generate said usage information messages dependent on the charging arrangement information for the first communication terminal.

REMARKS

Claims 29-56 are pending in this application. Claims 29-31 and 35-38 have been amended, and claim 56 has been added, by this Amendment.

Formal Drawings

Applicants submitted a proposed drawing correction for approval on September 2, 2004. The Examiner approved the proposed drawing correction in the Office Action dated January 27, 2005 and required formal drawings. Applicants have therefore submitted formal drawings, incorporating the approved corrections, simultaneously with this Amendment.

Examiner Interview

Applicants gratefully acknowledge the interview granted by Examiner Bhattacharya on April 26, 2005. In accordance with suggestions discussed at the interview, applicants have made several amendments to clarify the language of independent claims 29 and 54. In particular, applicants have changed the term "charging messages" to "usage information messages" throughout the claims. As noted in the interview, the new language is more consistent than the previous language with the recitation, already recited in the claims, that the messages "are indicative of the usage of the packet data communication services . . ." Applicants have also amended independent method claim 29 to clearly state that the steps of transferring and storing charging arrangement information relate to the charging arrangement information stored at and transferred from the subscriber information store.

Independent Claims 29, 54 and 56

Applicants respectfully submit that the amended independent claims 29 and 54, and new independent claim 56, are not rendered obvious by the network shown in Fig. 1 of WO 97/26739 to Kari et al. (this network hereafter referred to simply as "Kari") in view of WO 99/27723 to Nguyen et al. Claim 29 is directed to a method for performing charging in a telecommunications system and claim 54 is directed to a telecommunications system. New independent claim 56 is

directed to a packet data interface apparatus, and recites substantially the same features as claims 29 and 54.

Applicants respectfully submit that the cited references do not suggest each and every one of the combination of features recited in the independent claims. For example, the independent claims recite the features of: 1) transferring charging arrangement information stored in a subscriber information store from the subscriber information store to a packet data interface apparatus; and 2) generating usage information messages dependent on the charging arrangement information. It is important to recognize that there are two different but inter-related types of information recited in these features. There is charging arrangement information that may be, for example, a billing plan for data usage, and there are also usage information messages that are indicative of the usage of a subscriber and may, for example, indicate the amount of data downloaded to the subscriber. While these two types of information may not be unique, the manner in which they are recited as being used in features 1) and 2) above is unique and is not suggested by the cited prior art references.

Feature 1)

Conventionally, the charging arrangement information is stored in a billing center or similar system and bills are prepared based on usage information routinely collected and transferred to that billing center or similar system. According to feature 1) of the claims, the charging arrangement information is not kept only at the billing center or similar system, but it is instead transferred to a packet data interface apparatus. It was previously asserted in the obviousness rejection that Kari transfers and stores the charging arrangement information for the first communication terminal to the packet data interface apparatus. The rejection cited the sentence at page 8, lines 6-9, of WO 97/26739 for this feature, which states that "user-related data transfer statistics, used for charging the user, are also collected mainly at the serving GPRS support nodes SGSN, and in the gateway GPRS support nodes GGSN." However, the user-related data statistics in this cited sentence may be considered to be usage information, and they most certainly are not charging arrangement information for the first communication terminal. Although there may be charging arrangement information elsewhere in Kari, what is described as being transferred at page 8 is usage information, and there is simply no indication that charging arrangement information is transferred in Kari.

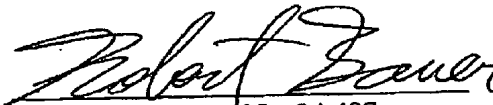
Feature 2)

Conventionally, usage information is routinely collected and usage information messages are routinely sent to the billing center or similar system by devices in the network without any knowledge of the charging arrangement information stored and applied in the billing center or similar system. According to feature 2) of the claims, the usage information messages are not routinely generated but are instead generated by a packet data interface apparatus dependent on the charging arrangement information which was transferred to the packet data transfer apparatus according to feature 1). It was asserted in the previous rejection that the sentences at pages 8, lines 11-17, of WO 97/26739 suggest feature 2). However, these sentences refer to typical billing principles such as subscriber fees and traffic fees. While such billing may be regarded as charging arrangement information, there is no indication that the generation of usage information messages in Kari is dependent on the billing arrangements. Indeed, at page 3, lines 6-9, it is stated that an object of Kari is that the information collecting system is "independent" of the billing system implementation. Thus, Kari actually teaches away from the claimed invention.

For at least the reasons stated above, applicants submit that the pending claims 29-56 are allowable over the cited references. A Notice of Allowance is respectfully requested.

Please charge any fees which may be necessary for the consideration of this Amendment, including an RCE fee and a fee for one additional independent claim, to Deposit Account No. 02-4270 (Dkt. No. 6173/4001US) and please credit any excess fees to such deposit account.

Respectfully Submitted,



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(12) **United States Patent**
Hurtta et al.

(10) **Patent No.:** **US 6,975,850 B1**
(45) **Date of Patent:** **Dec. 13, 2005**

(54) **CHARGING EFFICIENCY**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 420 days.

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§ 371 (c)(1),
(2), (4) Date: **Jan. 7, 2002**

(87) PCT Pub. No.: **WO01/39483**

PCT Pub. Date: **May 31, 2001**

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(51) Int. Cl.⁷ **H04M 11/00**

(52) U.S. Cl. **455/405; 455/406**

(58) Field of Search 455/406, 407, 455/408, 433; 379/114.01, 114.03, 114.21, 379/114.22, 114.23, 114.28, 115.01, 115.02, 379/115.03; 370/902, 912, 913

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Primary Examiner—Lester G. Kincaid

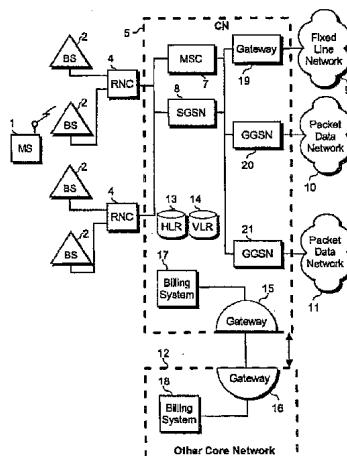
Assistant Examiner—Sam Bhattacharya

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(57) **ABSTRACT**

A method for performing charging in a telecommunications system, comprising: storing at a subscriber information store subscription information including charging arrangement information indicative of the charging arrangement for a first communication terminal operating in the telecommunications system; providing by means of packet data interface apparatus packet data communication services to the first terminal, the packet data interface apparatus being capable of interfacing between the first communication terminal and a packet-switched data link to another communications terminal; generating by means of the packet data interface apparatus charging messages indicative of the usage of the packet data communication services by the first terminal; transferring the charging messages to charging apparatus; and performing by means of the charging apparatus a charging operation to attribute to a subscriber for the first communications terminal a charge for use of the communication services by the first terminal; the method further including the steps of: transferring the charging arrangement information to the packet data interface apparatus; and storing at the packet data interface apparatus the charging arrangement information for the first communication terminal; and wherein the step of generating charging messages comprises generating the said charging messages dependant on the charging arrangement information for the first communication terminal.

27 Claims, 2 Drawing Sheets



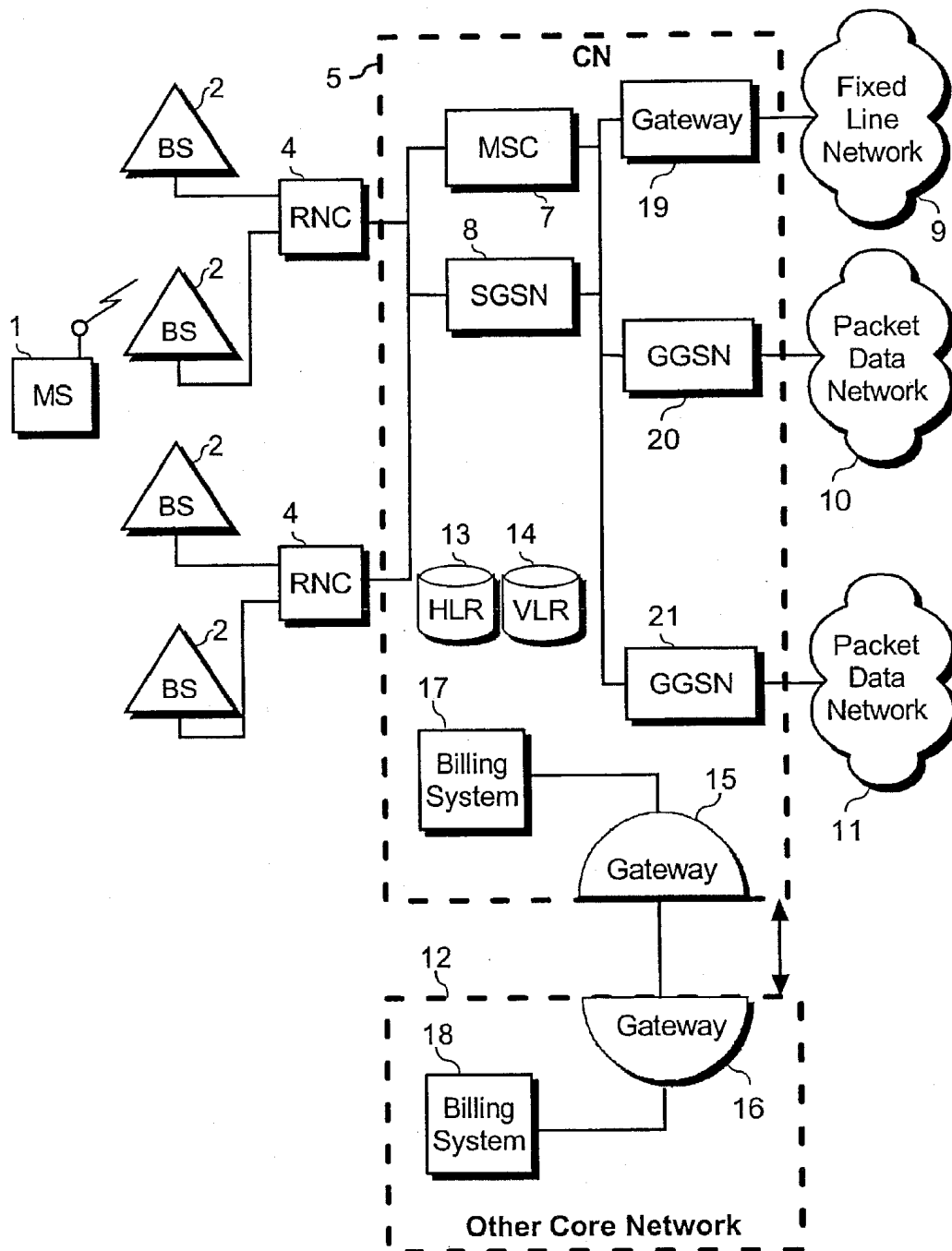
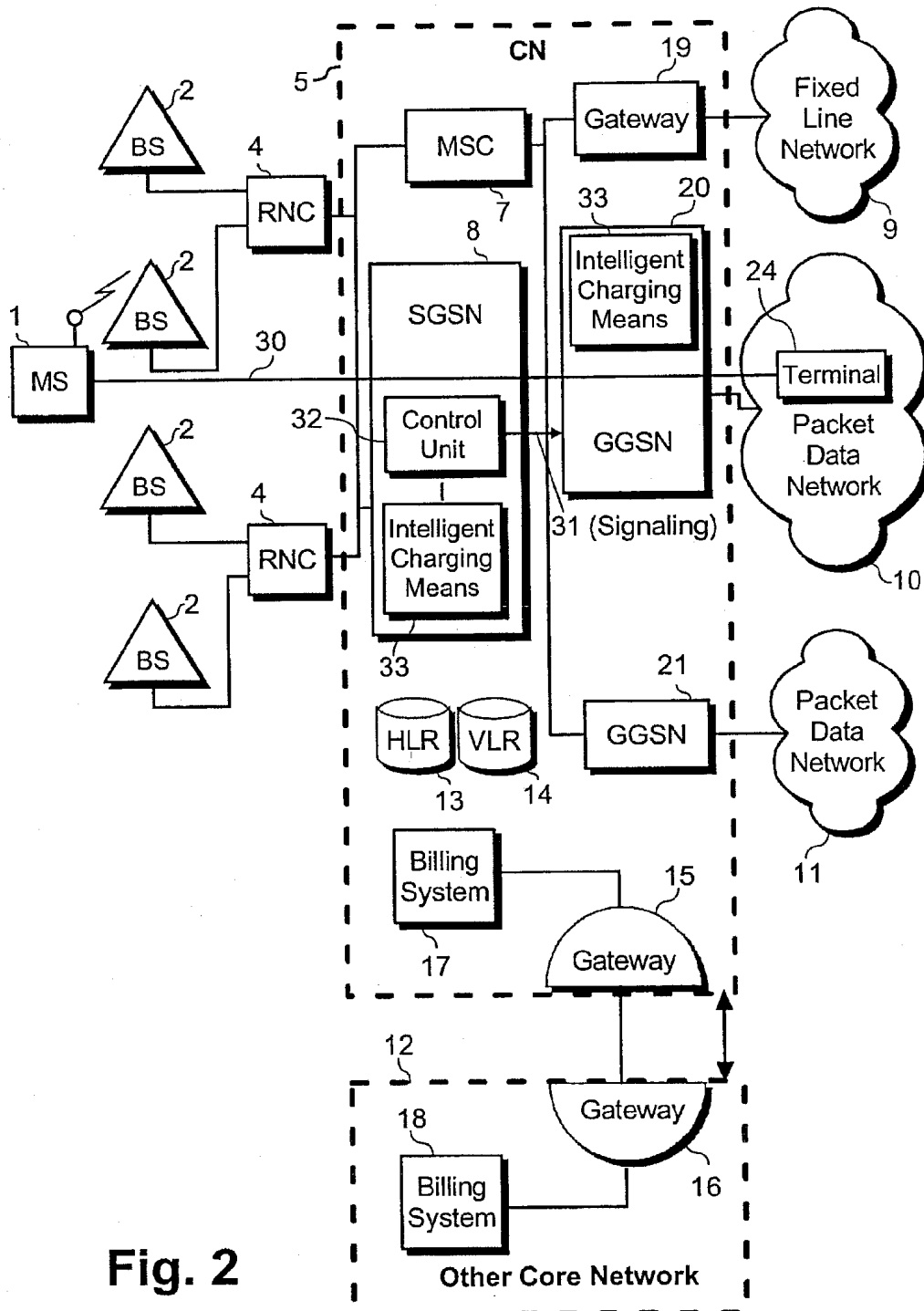


Fig. 1



CHARGING EFFICIENCY

This invention relates to methods and apparatus directed towards relatively efficient charging in a telecommunications system. The invention is especially, but not exclusively, suitable for implementation in the proposed UMTS (Universal Mobile Telecommunications System)/GPRS (general packet radio system) architecture.

FIG. 1 shows the general logical architecture proposed for UMTS/GPRS and also suitable for other systems. A mobile station (MS) 1 can communicate by radio with one or more base stations (BS) 2. The respective network element in GPRS is called a BTS (base transceiver station). Each base station is linked to a single radio network controller (RNC) 4. The respective network element in GPRS is called a BSC (base station controller). Each RNC can be linked to one or more BSs. Each RNC is linked to a core network (CN) 5. The CN includes one or more serving nodes that can provide communication services to a connected mobile station, for example a mobile switching centre (MSC) 7 and a serving GPRS (general packet radio service) support node (SGSN) 8. These units are connected to the RNCs. The CN 5 is also connected to other telecommunications networks such as a fixed line network 9, other mobile networks (e.g. another core network 12, not shown in detail in FIG. 1) or packet data networks 10, 11 such as the internet or proprietary networks to allow onward connection of communications outside the UMTS network. The CN also includes other units such as a home location register (HLR) 13 and a visitor location register (VLR) 14 which help to control access to the network. The HLR 13 stores the subscription details of mobile station subscribers to that CN itself. The VLR stores information on mobile stations that are currently attached to the CN. The BSs and the RNCs constitute a UMTS terrestrial radio access network (UTRAN). Each core network includes one or more charging gateway functionality entities 15, 16 and a billing system 17, 18 for performing billing operations. (In GPRS, for example, if the charging gateway functionality is embodied in a separate physical unit then the corresponding network element is known as a charging gateway (CG)). Each network entity generating charging information (like GGSN and SGSN in GPRS) is linked at least to one charging gateway functionality (CGF), but for redundancy reasons typically to several CGFs. (The charging gateways may also be linked together.) When a mobile station is operating in another core network from the one to which it is subscribed (its home network), that other core network can communicate charging information to the home network by means of the charging gateways and billing systems so that the home network can bill the subscriber for his use of the other core network.

In the core network each serving node such as an MSC or SGSN can provide a set of services to the mobile station. For example:

An MSC can provide circuit switched (CS) communications, for example for speech, fax or non-transparent data services, and therefore has a link to other entities in the circuit switched domain such as other CS mobile networks such as GSM (Global System for Mobile communications) and CS fixed wire networks such as conventional voice telephony networks.

An SGSN can provide packet switched (PS) communications, for example for packet data protocol (PDP) contexts for internet protocol (IP) data transmission, and therefore has a link to other entities in the packet switched domain such as GPRS-equipped GSM networks and the internet. The packet switched services may include traditional data

services such as file transfer, e-mail and world-wide web (WWW) browsing and derived data services such as voice-over-IP (e.g. by means of the H.323 protocol).

The division of services between serving nodes is specified in the system specification and is tied to the assumed network architecture. There may be other nodes than the MSC or SGSN providing overlapping or additional services.

When a mobile station begins operating for communication in the coverage area of the core network it first undergoes a process of attachment to the core network. In that process the mobile station indicates its identity, and then undergoes a process of attachment to the network. The core network obtains subscription information for the mobile station from the HLR of the core network to which the mobile station is subscribed. The subscription information includes access information indicating the services that the mobile station is entitled to receive (e.g. the access points—for example in a GGSN—to which the mobile station may have access), and billing information indicating the method by which the subscriber is billed (e.g. normal subscription, pre-paid subscription, hot billing subscription or flat rate subscription; and whether billing is to be dependant on the access point that is used). Using that information the core network can provide services to the mobile station and cause the subscriber to be billed accordingly. After having attached to the network the mobile station may communicate to the core network its need for communication services, for example involving activation of a PDP context in the GPRS system.

In some systems, e.g. GPRS, CDR (call detailed record) tickets or other charging messages are collected by the charging gateway functionality and sent onwards as a file towards the appropriate billing system periodically, and after some delay. For example, such files may be sent every 10 or 30 minutes. In hot billing the messages are typically sent promptly towards the appropriate billing system or billing server after no delay or only a few seconds' delay. This can enable services such as advice of charge (AoC) and pre-paid subscriptions to be provided more effectively.

The core network includes gateway equipment 19, 20, 21 for interfacing with the other networks 9, 10, 11. Where the respective other network is a packet switched network (e.g. networks 10, 11) the gateway equipment is a GGSN (gateway GPRS support node), which interfaces between the SGSN 8 and the respective network. During a communication session and/or after a session has been completed the GGSN through which the session was routed generates one or more CDR ticket messages which are directed to the appropriate charging system so that the subscriber can be billed for the session.

Under a so-called normal charging arrangement a subscriber is charged simply on the basis of the duration of sessions initiated by his mobile station, or a like measure such as the amount of data sent and/or received by the mobile station (e.g. the number of data octets sent and received). This arrangement is served efficiently by the above charging method. However, alternative charging arrangements are becoming increasingly popular with subscribers. These arrangements include:

1. pre-paid billing, in which a subscriber makes a prepayment for sessions in advance and the costs of sessions that are made are deducted from the prepayment; and
2. flat rate subscription, in which a subscriber is charged a fixed amount irrespective of how many sessions he makes.

The inventors of the present invention have identified that the charging of the latter arrangements could potentially be achieved more efficiently if there were a means whereby the sending of CDR ticket messages (or other analogous charging messages) could be better adapted to those arrangements.

According to one aspect of the present invention there is provided A method for performing charging in a telecommunications system, comprising: storing at a subscriber information store subscription information including charging arrangement information indicative of the charging arrangement for a first communication terminal operating in the telecommunications system; providing by means of packet data interface apparatus packet data communication services to the first terminal, the packet data interface apparatus being capable of interfacing between the first communication terminal and a packet-switched data link to another communications terminal; generating by means of the packet data interface apparatus charging messages indicative of the usage of the packet data communication services by the first terminal; transferring the charging messages to charging apparatus; and performing by means of the charging apparatus a charging operation to attribute to a subscriber for the first communications terminal a charge for use of the communication services by the first terminal; the method further including the steps of: transferring the charging arrangement information to the packet data interface apparatus; and storing at the packet data interface apparatus the charging arrangement information for the first communication terminal; and wherein the step of generating charging messages comprises generating the said charging messages dependant on the charging arrangement information for the first communication terminal.

According to a second aspect of the present invention there is provided a telecommunications system, comprising: a subscriber information store storing subscription information including charging arrangement information indicative of the charging arrangement for a first communication terminal operating in the telecommunications system; packet data interface apparatus for providing packet data communication services to the first terminal, the packet data interface apparatus being capable of interfacing between the first communication terminal and a packet-switched data link to another communications terminal, and generating charging messages indicative of the usage of the packet data communication services by the first terminal; message transfer apparatus for transferring the charging messages to charging apparatus capable of performing a charging operation to attribute to a subscriber for the first communications terminal a charge for use of the communication services by the first terminal; and wherein the packet data interface apparatus is adapted to receive and store the charging arrangement information for the first communication terminal and to generate the said charging messages dependent on the charging arrangement information for the first communication terminal.

Suitably the step of generating the charging messages comprises: determining on the basis of the charging arrangement information for the first communication terminal stored at the packet data interface apparatus whether a communication with the first terminal is liable to charging; and generating a charging message for the communication if the communication is liable to charging. In one preferred embodiment such a message is generated only if the communication is liable to charging. In another preferred embodiment such a message is not generated if the communication is not liable to charging. In another preferred

embodiment such a message may also be generated regardless of liability of the charging. This would give an operator an option to check and control charging related information. Suitably, it is determined that a communication is not liable for charging if charging arrangement information for the first communication terminal stored at the packet data interface apparatus indicates that the communication is subject to flat rate payment and/or pre-payment and/or is not to be charged for.

An example of a communication that may not be to be charged for is the carrying of call setup messages.

The charging message may be indicative of the duration and/or type of the communication and/or the amount of data transmitted and/or received by the first communication terminal and/or of the identity of the first communication terminal. The charging message may be a CDR ticket or the like.

The step of transferring the charging arrangement information to the packet data interface apparatus may preferably be performed during attachment of the first communication terminal to the telecommunications system. Alternatively it may be performed afterwards.

The subscriber information store is preferably a home location register or the like.

The packet data interface apparatus is suitably capable of interfacing between a packet radio connection with the first communication terminal and a packet-switched data link to the other communications terminal. The packet radio connection may be a general packet radio service (GPRS) connection. The packet data interface apparatus may comprise a serving GPRS support node (SGSN). The charging arrangement information for the first communication terminal may then be stored at the SGSN. The packet data interface apparatus may comprise a gateway GPRS support node (GGSN). The charging arrangement information for the first communication terminal may then be stored at the GGSN.

Suitably the step of transferring the charging arrangement information to the packet data interface apparatus comprises transferring the charging arrangement information to the SGSN. There may then be a step of transferring the charging arrangement information from the SGSN to the GGSN. Alternatively, the information may go directly to the GGSN.

The step of determining whether a communication with the first terminal is liable to charging is preferably performed by means of the SGSN, although it could be performed additionally or alternatively by the GGSN or another item of equipment. The step of generation of the charging messages is preferably performed by means of the GGSN and the SGSN; alternatively it could be performed by one of those entities with or without or another item of equipment.

The telecommunications system may be a radio telephone system and/or a mobile telephone system. The first terminal and the system may be adapted such that there can be communication between the first terminal and the packet data interface apparatus by means of a radio link, for example between the first terminal and a base station, or a plurality of parallel radio links (e.g. in a soft handover condition). The telecommunications system may be a universal mobile telecommunications system (UMTS) system or any other appropriate system. The first terminal may be a mobile station. Such a station may be physically mobile or may be fixed in location.

The present invention will now be described by way of example with reference to the accompanying drawings, in which

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FIG. 1 is a schematic diagram of the currently-proposed architecture for a UMTS telecommunications system;

FIG. 2 is a schematic diagram of an architecture for a UMTS telecommunications system including an enhanced charging system.

For illustration of the present invention relevant aspects of the UMTS architecture will now be described in more detail with reference to FIG. 2. In FIG. 2 like components are indicated as for FIG. 1.

The core network 5 is capable of supporting data communications between a mobile station operating in the coverage area of a base station serving the network and another terminal. That terminal could be a mobile station in that coverage area (in which case the connection can be handled entirely within the core network) or another data-compatible terminal in another network connected to the core network. In the latter case, for example, the path of the connection is from the mobile station via radio to one or more base stations and then by communication links (normally fixed line communication links) from the base station(s) to the respective RNC 4 the SGSN 8 of the core network, the appropriate GGSN (e.g. GGSN 20) of the core network and then to the other network (e.g. network 10) and a terminal 24 operating in it. This path is indicated at 30 in FIG. 2. The function of the SGSN and the GGSN is to interface between the GPRS protocol used over the radio interface with the mobile station and the packet switched protocol used in the respective other network.

When a mobile station attaches to the core network it identifies itself by means of an identification code. That code includes an indication of the network to which the mobile station is subscribed (its home network). The home network of the mobile station comprises an HLR database that includes subscription data (a subscriber profile) for the mobile station. In order to provide the mobile station with communication services the core network needs to obtain that subscription data—in particular in order to determine to what services the mobile station may be allowed access and to determine how the subscriber of the mobile station is to be billed for services that are used. The core network therefore addresses the HLR of the mobile station's home network and in response receives the subscription data for the mobile station. (The mobile station's home network may be the core network itself, in which case the data is available from the core network's own HLR). If the subscription data indicates that the mobile station may receive communication services from the core network then the core network arranges for the capability to provide the mobile station with those services.

In the system of FIG. 2 the subscription information for the mobile station is passed to the SGSN of the core network so that the SGSN may supervise access to the services, and improve the efficiency of charging in the system as described below.

The information in the subscription data that indicates the services to which the mobile station may have access may include several aspects of data. These may be referred to as policing criteria. The information may indicate what types of services are to be available to the mobile station: for instance voice, data or messaging services. It may indicate that the availability of any of those services is dependant on factors such as the time of day (for example the mobile station may be allowed to initiate sessions only at off-peak times), or the access point(s), which are suitably in the GGSN, that are used by the mobile station, or the location of the mobile station. For example, the mobile station may be restricted to accessing the network from one or more base stations near

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an employer's office. Other information in the policing criteria may indicate whether network activated PDP context activations are allowed to the mobile station.

The information in the subscription data that indicates the charging policy to be used for the mobile station may also include several aspects of data. It may indicate the charging arrangement (normal, pre-paid etc.) to be applied to the mobile station. The charging arrangement may be different for different types of services. The charging policy to be applied to the mobile station may be dependant on factors such as the date or time of day and the access point (referred to as APN—access point name) that is used. For example, one arrangement that may well become commonplace is for a subscriber to be charged a fixed fee for all sessions made at one APN (at the subscribers home or office) and for sessions made at other APNs to be billed normally. In this arrangement there could be no need for charging messages for the sessions made at the said one APN because those sessions are not billed for individually. However, charging messages are needed for sessions from elsewhere. Other possibilities are that all use of a certain APN may be uncharged.

When the mobile station has registered successfully with the core network it can make and receive data by means of communication sessions using the services of the network. To do so involves first the activation of a PDP context, after which data can be sent or received. Thus, when an outgoing or incoming session is initiated a PDP (packet data protocol) context is activated in the core network to serve the communication requirements of the session. The network elements to be used for the session are configured appropriately for the type of session—for example if the session involves a voice call, a data call or a voice-over-IP call the appropriate APN may be modified to include information on the requested service. If the session involves a data call then it will be routed via the SGSN and the appropriate GGSN as illustrated in FIG. 2. The GGSN generates one or more charging ticket messages (CDR messages) for the session, which are routed to the charging system appropriate to the mobile station. In the system of FIG. 1 many such messages may have been redundant since they related to sessions that were not to be billed for individually. In the system of FIG. 2, information on the charging profile is transmitted from the SGSN to the GGSN. This may be done at PDP context activation, in which case the SGSN need only send the information to the GGSN that has been selected to handle the session; or at another time. This signalling is illustrated at 31 in FIG. 2. In FIG. 2 the SGSN is shown as including a control unit 32 for handling that signalling. Such a control means may be a dedicated or shared hardware unit or may be provided essentially by software. The GGSN includes intelligent charging means 33 for storing the information and for modifying its generation of CDR tickets in dependence on the information. Those means may be in dedicated or shared hardware or in software.

The intelligent charging means is arranged to determine using the charging information received from the SGSN whether or not a particular PDP context is to be charged for individually. This may require knowledge by the GGSN of factors such as the APN of the PDP context and the current time of day. Some of that information may be available from the PDP context itself. If the PDP context is to be charged for individually (for instance if it is to be governed by a normal charging regime) then the SGSN and the GGSN generate CDR ticket(s) for the PDP context as normal. However, if the PDP context is not to be charged for individually (for instance if it governed by a flat fee charging

regime) then the SGSN and the GGSN do not generate CDR ticket(s) for the PDP context. In that case there is no need for the CDR tickets that would otherwise have been generated to be passed to the appropriate charging system, which could be in another core network. Thus the signalling load generated by the handling of CDR tickets can be dramatically reduced, especially in system where flat fee charging is common. For example, if system-wide pre-paid or flat fee charging were used the system of FIG. 2 could provide a great reduction in the signalling needed for charging ticket messages. These reductions in signalling would offer a corresponding reduction in the cost of setting up the networks because less signalling equipment would be required.

To implement the transmission of the subscriber information to the SGSN from the HLR elements could be provided in the MAP (mobile application part) message structure for HLR-SGSN signalling.

The APN used for a session could be used as a criterion for determining to which network element (NE) CDRs (e.g. prepaid CDRs) should be routed from a GGSN or a CGF (charging gateway functionality). It is possible to implement common subscriber profile definitions, which include services available to more than one subscriber. Such definitions could include APNs to which all subscribers having that profile are entitled to use (unless they are specifically denied that use by means of an exception).

In one preferred arrangement the (server) address to which CDRs are to be delivered from the CGF, (charging gateway functionality) could be defined according to charging profile/charging characteristics. For example, an independent functionality entity/server could be provided, that handles prepaid CDRs, which does not produce bills as the Billing System, but which decreases the account balance of a prepaid account (amount of money in pre-paid account) according to used network resources.

The present invention has been described with specific reference to the GPRS system and to the proposed UMTS third generation mobile telecommunications system. However, the invention is not limited to such systems and may be implemented with other systems and standards.

The applicant draws attention to the fact that the present invention may include any feature or combination of features disclosed herein either implicitly or explicitly or any generalisation thereof, without limitation to the scope of any of the present claims. In view of the foregoing description it will be evident to a person skilled in the art that various modifications may be made within the scope of the invention.

What is claimed is:

1. A method for performing charging in a telecommunications system, comprising:

storing at a subscriber information store subscription information including charging arrangement information indicative of the charging arrangement for a first communication terminal operating in the telecommunications system;

providing by means of packet data interface apparatus packet data communication services to the first terminal, the packet data interface apparatus being capable of interfacing between the first communication terminal and a packet-switched data link to another communications terminal;

generating by means of the packet data interface apparatus usage information messages indicative of the usage of the packet data communication services by the first terminal; and

transferring the usage information messages to a charging apparatus;

the method further including the steps of:

transferring the charging arrangement information stored at the subscriber information store from the subscriber information store to the packet data interface apparatus; and

storing at the packet data interface apparatus the charging arrangement information received from the subscriber information store for the first communication terminal; and

wherein the step of generating usage information messages comprises generating the said usage information messages dependent on the charging arrangement information for the first communication terminal.

2. A method as claimed in claim 1, wherein a charging operation to attribute to a subscriber for the first communications terminal a charge for use of the communication services by the first terminal is performed by means of the charging apparatus.

3. A method as claimed in claim 1, wherein the step of generating the usage information messages comprises:

determining on the basis of the charging arrangement information for the first communication terminal stored at the packet data interface apparatus whether a communication with the first communication terminal is liable to charging; and

generating a charging message for the communication if the communication is liable to charging.

4. A method as claimed in claim 2, wherein it is determined that a communication is not liable for charging if charging arrangement information for the first communication terminal stored at the packet data interface apparatus indicates that the communication is subject to pre-payment.

5. A method as claimed in claim 2, wherein it is determined that a communication is not liable for charging if charging arrangement information for the first communication terminal stored at the packet data interface apparatus indicates that the communication is free of charge.

6. A method as claimed in claim 2 wherein it is determined that a communication is not liable for charging if a session itself indicates that the communication is free of charge.

7. A method as claimed in claim 1 wherein the usage information message is indicative of the duration and/or type of the communication.

8. A method as claimed in claim 1 wherein the usage information message is indicative of an amount of data transferred in the communication.

9. A method as claimed in claim 1 wherein the usage information message is indicative of the identity of the first communication terminal.

10. A method as claimed in claim 1 wherein the usage information message is a CDR ticket.

11. A method as claimed in claim 1 wherein the step of transferring the charging arrangement information to the packet data interface apparatus is performed during attachment of the first communication terminal to the telecommunications system.

12. A method as claimed in claim 1 wherein the subscriber information store is a home location register.

13. A method as claimed in claim 12 wherein the home location register stores information indicative of access point names available to the first terminal, and the method includes the step of accessing that information.

14. A method as claimed in claim 1 wherein the packet data interface apparatus is capable of interfacing between a

packet radio connection with the first communication terminal and a packet-switched data link to the other communications terminal.

15. A method as claimed in claim 14, wherein the packet radio connection is a general packet radio service (GPRS) connection.

16. A method as claimed in claim 1 wherein the packet data interface apparatus comprises a serving GPRS support node (SGSN).

17. A method as claimed in claim 16, wherein the charging arrangement information for the first communication terminal is stored at the SGSN.

18. A method as claimed in claim 1 wherein the packet data interface apparatus comprises a global GPRS support node (GGSN).

19. A method as claimed in claim 18, wherein the charging arrangement information for the first communication terminal is stored at the GGSN.

20. A method as claimed in claim 18 wherein the step of transferring the charging arrangement information to the packet data interface apparatus comprises transferring the charging arrangement information to the SGSN.

21. A method as claimed in claim 20, comprising the step of transferring the charging arrangement information from the SGSN to the GGSN.

22. A method as claimed in claim 21 wherein the said step of transferring the charging arrangement information from the SGSN to the GGSN is performed if it is determined that the communication is subject to hot billing.

23. A method as claimed in claim 18 wherein the step of determining whether a communication with the first terminal is liable to charging is performed by means of the SGSN and the GGSN.

24. Previously presented) A method as claimed in claim 23 wherein the said step of generation of the usage infor-

mation messages is performed by means of the GGSN and SGSN.

25. A method as claimed in claim 1 wherein the telecommunications system is a universal mobile telecommunications system (UMTS).

26. A telecommunications system, comprising:

a subscriber information store storing subscription information including charging arrangement information indicative of the charging arrangement for a first communication terminal operating in the telecommunications system;

packet data interface apparatus for providing packet data communication services to the first terminal, the packet data interface apparatus being capable of interfacing between the first communication terminal and a packet-switched data link to another communications terminal, and generating usage information messages indicative of the usage of the packet data communication services by the first terminal;

message transfer apparatus for transferring the usage information messages to a charging apparatus;

and wherein the packet data interface apparatus is adapted to receive and store the charging arrangement information for the first communication terminal and to generate the said usage information messages dependant on the charging arrangement information for the first communication terminal.

27. A telecommunications system as claimed in claim 26, wherein charging apparatus is capable of performing a charging operation to attribute to a subscriber for the first communications terminal a charge for use of the communication services by the first terminal.

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